इंटरनेट मानक

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IS 8422-6 (1977): Piston rings for IC engines, Part 6: Slotted oil control rings from 50 up to 200 mm nominal diameter S-Rings [TED 2: Automotive Primemovers]

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IS : 8422 (Part VI) - 1977

Indian Standard (Reaffirmed 2000)

SPECIFICATION FOR PISTON RINGS FOR IC ENGINES

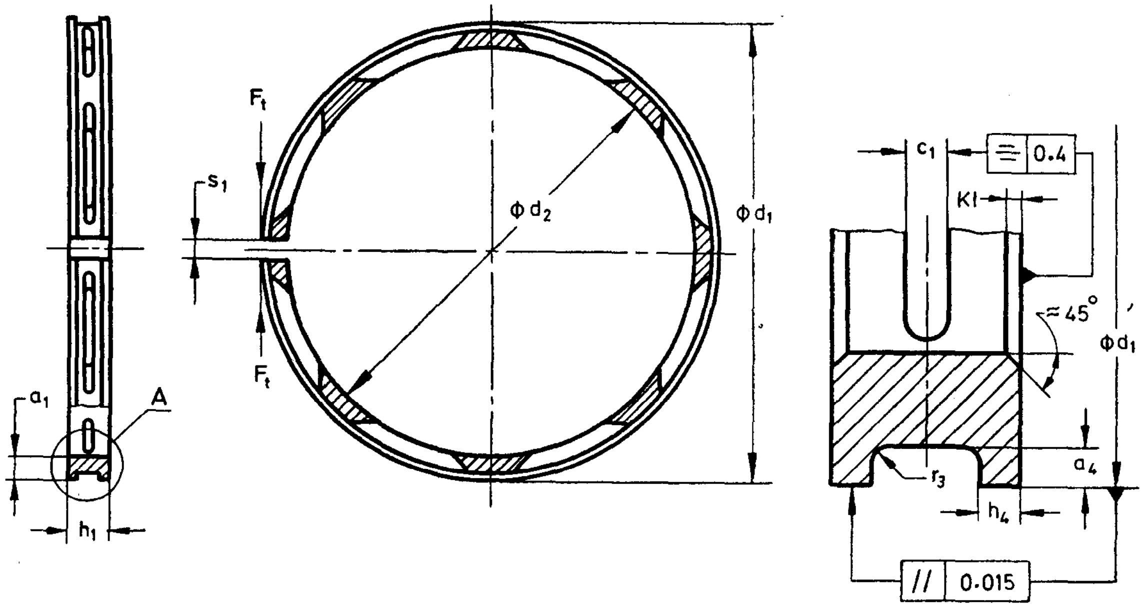
PART VI SLOTTED OIL CONTROL RINGS FROM 50 UP TO 200 mm NOMINAL DIAMETER

S-RINGS

Internal Combustion Engines Sectional Committee, EDC 14; Piston Assembly Components Subcommittee, EDC 14 : 1 [Ref: Doc : EDC 14 (2638)]

1. Scope — Specifies the dimensions, tolerances, tangential loads and other details of S-rings (slotted oil control rings) from 50 up to 200 mm nominal diameter for internal combustion engines.

2. Dimensions and Tolerances — Shall be as given in Table 1, read along with Fig. 1.



DETAIL A
SHOWING CHAMFERING OF INTERNAL EDGES (KI)

All dimensions in millimetres.

FIG. 1 SLOTTED OIL CONTROL RING (S-RING)

2.1 *Arrangement of Slots* — Shall be according to Fig. 2.

3. Designation — Shall include:

a) Type of ring;
b) Nominal diameter, d_1;
c) Axial width, h_1;
d) Number of this standard;
e) Material symbol;
f) Manufacturing process;
g) Whether inside edges chamfered (KI); and
h) Type of coating.

Example:

A slotted oil control ring (S-ring) of nominal diameter d_1=90 mm, axial width h_1=5 mm, made of alloyed cast iron (A4), inside edges chamfered (KI) and phosphated on all sides (P) shall be designated as:

S-Ring 90×5 IS : 8422 (Part VI) A4 KI P

Adopted 20 June 1977 © August 1978, ISI Price Rs. 7·00

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

TABLE 1 DIMENSIONS AND TANGENTIAL LOADS OF S-RINGS

(*Clause* 2, *Fig.* 1 and 2)

(All dimensions in millimetres)

Nominal Diameter	Inside Diameter	Radial Wall Thickness		Axial Width of Ring h_1		Closed Gap	Chamfering of Inside Edges	Radius	Land h_4 for h_1 Shown in Column		Depth of Groove	Number of Slots	Width of Slots c_1 for h_1 Shown in Column		Tangential Force F_t* in N±20% for h_1 Shown in Column	
d_1	d_3	a_1	Tol	1	2	s_1	Kl	r_3	1	2	a_4		1	2	1	2
50	45·8	2·1	+0·10 −0·20 with a maximum variation of 0·15 in a ring	$4^{-0{\cdot}010}_{-0{\cdot}022}$	$4{\cdot}5^{-0{\cdot}010}_{-0{\cdot}022}$	$0{\cdot}15^{+0{\cdot}25}_{0}$	0·2±0·1	0·5	$0{\cdot}7^{+0{\cdot}10}_{-0{\cdot}05}$	$0{\cdot}8^{+0{\cdot}10}_{-0{\cdot}05}$	0·6±0·1	6	1±0·1	1·2±0·1	10·4	11·7
52	47·6	2·2													11·2	12·6
53	48·5	2·25													11·6	13·0
54	49·4	2·3													12·0	13·5
55	50·4	2·3													11·5	12·9
(55·07)	50·47	2·3													11·4	—
56	51·3	2·35									0·8±0·1				11·1	12·5
58	53·1	2·45													11·9	13·4
60	54·9	2·55				$0{\cdot}20^{+0{\cdot}25}_{0}$						8			12·7	14·2
(60·33)	55·23	2·55													12·4	—
62	56·8	2·6													12·6	14·2
63	57·7	2·65			$5^{-0{\cdot}010}_{-0{\cdot}022}$					$0{\cdot}9^{+0{\cdot}10}_{-0{\cdot}05}$					13·0	16·5
64	58·6	2·7													13·4	17·0
65	59·5	2·75													13·8	17·5
66	60·4	2·8													14·2	18·0
(66·68)	61·08	2·8													13·7	—
67	61·4	2·8													13·7	17·4
68	62·3	2·85													14·1	17·9
(69·88)	63·98	2·95									1±0·1				14·1	—
70	64·1	2·95													14·1	17·9
(70·04)	—	—													—	—
72	65·9	3·05													14·8	18·9
(73·02)	66·82	3·1													14·1	—
74	67·8	3·1													14·8	18·8
75	68·7	3·15				$0{\cdot}25^{+0{\cdot}25}_{0}$									15·2	19·3
76	69·6	3·2													15·6	19·8
(77·0)	70·4	3·3													16·9	—
78	71·4	3·3													16·3	20·8
(79·38)	72·68	3·35													16·7	—
80	73·3	3·35	+0·10 −0·25 with a maximum variation of 0·18 in a ring				0·3±0·15								16·3	20·7
82	75·1	3·45													17·1	21·7
(82·55)	75·65	3·45													16·7	—
84	76·9	3·55													17·9	22·7

85	77·8	3·6	+0·10 −0·25 with a maximum variation of 0·18 in a ring	$4^{-0.010}_{-0.022}$	$5^{-0.010}_{-0.022}$	$0.25^{+0.25}_{0}$	0·3±0·15	0·5	$0.7^{+0.10}_{-0.05}$	$0.9^{+0.10}_{-0.05}$	1±0·1	8	1±0·1	1·2±0·1	18·3	23·2
86	78·8	3·6													17·8	22·6
(87·31)	79·91	3·7													19·0	—
88	80·6	3·7													18·6	23·6
(88·90)	81·50	3·7													18·0	—
(88·92)	81·52	3·7													18·0	—
90	82·4	3·8				$0.30^{+0.30}_{0}$					1·2±0·1				18·5	23·6
92	84·2	3·9													19·4	24·5
(92·08)	84·28	3·9													19·3	—
94	86·1	3·95													19·3	24·5
95	87	4													19·6	25·0
(95·25)	87·25	4·0													19·4	—
96	87·9	4·05													20	25·5
98	89·7	4·15													20·9	26·4
(98·42)	90·12	4·15													20·6	—
(98·43)	90·13	4·15													20·6	—
100	91·6	4·2		$5^{-0.010}_{-0.022}$	$6^{-0.010}_{-0.022}$				$0.9^{+0.10}_{-0.05}$	$1.1^{+0.10}_{-0.05}$			1·2±0·1	1·4±0·1	20·8	26·4
(100·61)	92·21	4·2													20·4	—
(101·69)	93·09	4·3													27·0	—
102	93·4	4·3													27·3	33·1
(103·17)	94·57	4·3													26·7	—
(103·35)	94·75	4·3													26·6	—
104	95·4	4·3													26·1	31·6
105	96·1	4·45										10			28·8	34·8
106	97	4·5													29·2	35·4
(107·95)	98·95	4·5													28·0	—
108	99	4·5													28·0	33·9
110	100·8	4·6													29·0	35·0
(111·18)	101·78	4·7													30·5	—
112	102·6	4·7													29·8	36·2
114	104·6	4·7													28·7	34·7
(114·30)	104·90	4·7													28·4	—
115	105·4	4·8									1·4±0·1				29·1	35·2
116	106·4	4·8													28·5	34·5
118	108·2	4·9													29·4	35·6
120	110	5													30·2	36·7
122	112	5													29·1	35·3
124	114	5													28·0	34·0
125	114·6	5·2				$0.40^{+0.30}_{0}$	0·4±0·15								31·4	38·1
126	115·6	5·2													30·9	37·4
128	117·6	5·2													29·7	36·1
130	119·2	5·4		$6^{-0.010}_{-0.022}$	$7^{-0.013}_{-0.028}$				$1.1^{+0.10}_{-0.05}$	$1.3^{+0.10}_{-0.05}$			1·4±0·1	1·6±0·1	39·5	46·3
(130·17)	119·37	5·4													39·3	—
132	121·2	5·4													38·1	44·8
134	123·2	5·4													36·9	43·3

(*Continued*)

TABLE 1 DIMENSIONS AND TANGENTIAL LOADS OF S-RINGS — *Contd*

(All dimensions in millimetres)

Nominal Diameter	Inside Diameter	Radial Wall Thickness		Axial Width of Ring h_1		Closed Gap	Chamfering of Inside Edges	Radius	Land h_4 for h_1 Shown in Column		Depth of Groove	Number of Slots	Width of Slots c_1 for h_1 Shown in Column		Tangential Force F_t* in N±20% for h_1 Shown in Column	
d_1	d_2	a_1	Tol	1	2	s_1	Kl	r_3	1	2	a_4		1	2	1	2
135	124	5·5	$^{+0\cdot10}_{-0\cdot25}$ with a maximum variation of 0·18 in a ring	$6^{-0\cdot010}_{-0\cdot022}$	$7^{-0\cdot013}_{-0\cdot028}$	$0\cdot40^{+0\cdot30}_{0}$	0·4±0·15	0·5	$1\cdot1^{+0\cdot10}_{-0\cdot05}$	$1\cdot3^{+0\cdot10}_{-0\cdot05}$	1·6±0·1	10	1·4±0·1	1·6±0·1	37·3	43·8
136	125	5·5													36·7	43·1
138	127	5·5													35·4	41·7
140	128·6	5·7										12			38·7	45·5
142	130·6	5·7													37·4	44
(142·87)	131·47	5·7													37·1	—
144	132·6	5·7													36·2	42·6
145	133·2	5·9													40	47
146	134·2	5·9													39·4	46·3
148	136·2	5·9													38·2	44·8
150	138	6				$0\cdot50^{+0\cdot30}_{0}$									39·2	46
152	140	6													38	44·6
154	142	6													36·8	43·2
155	142·6	6·2									1·8±0·1				39·3	46·2
156	143·6	6·2													38·7	45·5
158	145·6	6·2													37·6	44·2
160	147·2	6·4													40·6	47·7
162	149·2	6·4													39·4	46·3
164	151·2	6·4													38·3	45·0
165	152	6·5													39·8	46·8
166	153	6·5													39·2	46·1
168	155	6·5													38·2	44·8
170	156·6	6·7													41·1	48·3
172	158·6	6·7													40	46·9
174	160·6	6·7													38·9	45·7
175	161·2	6·9	$^{+0\cdot15}_{-0\cdot30}$ with a maximum variation of 0·23 in a ring	$7^{-0\cdot013}_{-0\cdot028}$	$8^{-0\cdot013}_{-0\cdot028}$	$0\cdot60^{+0\cdot30}_{0}$	0·6±0·2		$1\cdot3^{+0\cdot10}_{-0\cdot05}$	$1\cdot6^{+0\cdot15}_{-0\cdot10}$	2±0·15		1·6±0·1	1·8±0·1	48·5	57·2
176	162·2	6·9													47·8	56·5
178	164·2	6·9													46·6	55

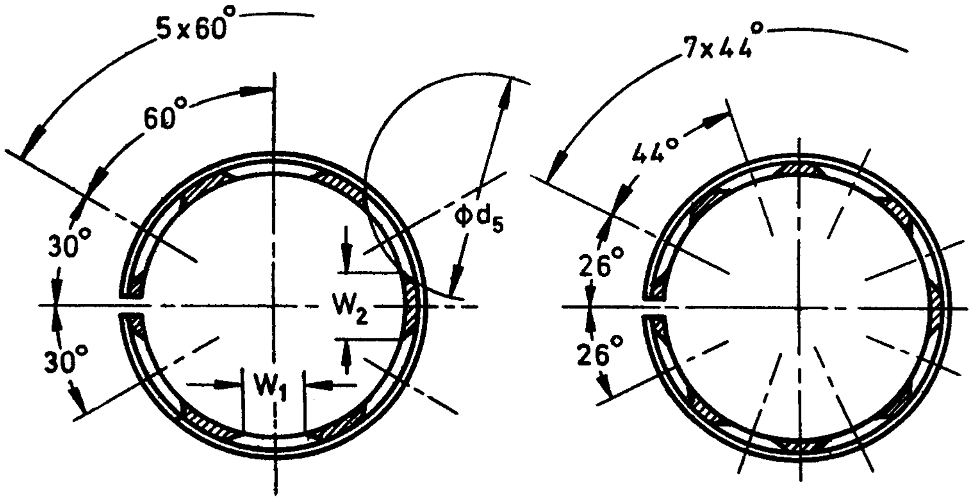
180	165·8	7·1	$^{+0·15}_{-0·30}$ with a maximum variation of 0·23 in a ring	$7^{-0·013}_{-0·028}$	$8^{-0·013}_{-0·028}$	$0·60^{+0·30}_{0}$	0·6±0·2	0·5	$1·3^{+0·10}_{-0·05}$	$1·6^{+0·15}_{-0·10}$	2±0·15	12	1·6±0·1	1·8±0·1	49·9	58·8
182	167·8	7·1													48·6	57·3
184	169·8	7·1													47·3	55·8
185	170·6	7·2													49	57·7
186	171·6	7·2													48·4	57
188	173·6	7·2													47·1	55·5
190	175·2	7·4													49·2	57·8
192	177·2	7·4													47·9	56·4
194	179·2	7·4													50·4	59·3
195	180	7·5													49·5	58·3
196	181	7·5													48·8	57·6
198	183	7·5													47·7	56·1
200	184·6	7·7													50·8	59·8

Note 1 — Dimensions within the parentheses are not valid for new designs.

Note 2 — For intermediate sizes and oversizes for reboring, the dimensions and characteristics (other than d_3) of the next smaller nominal diameter apply.

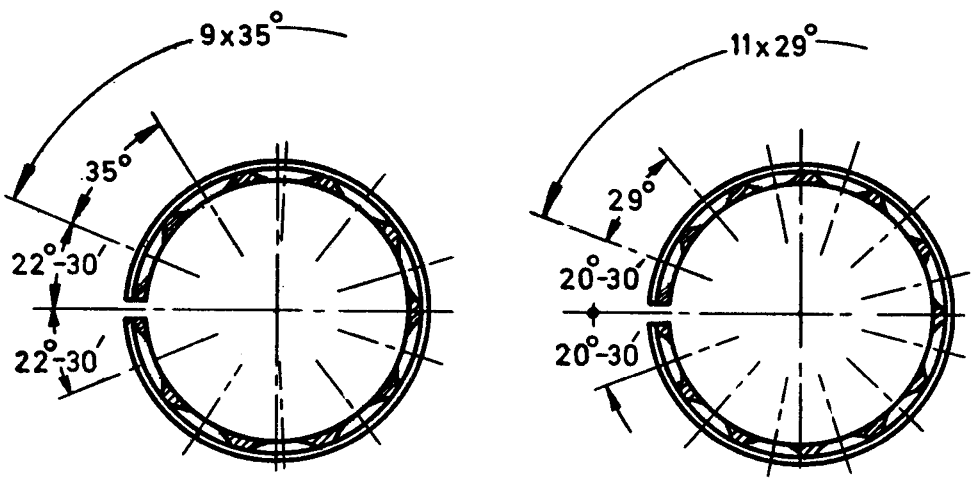
Note 3 — Tangential force F_t in columns 1 and 2 corresponds to axial width h_1 given in columns 1 and 2 respectively.

*Tangential load values are applicable for material A1 only [*see* IS : 5791-1977 Technical supply conditions for piston rings for IC engines (*first revision*)]. For other materials, load factors given in IS : 5791-1977 shall be used.



6 SLOTS
FOR d_1 UP TO 58mm

8 SLOTS
FOR d_1=60 TO 104mm



10 SLOTS
FOR d_1=105 TO 138mm

12 SLOTS
FOR d_1=140 TO 200mm

d_1 mm	*Outside Diameter of Cutter* d_5 mm	*Maximum Difference Between* W_1 *and* W_2 mm
Up to 168	45 to 60	2
Above 170	55 to 75	4

FIG. 2 ARRANGEMENT OF SLOTS

4. General Requirements — Shall be as given in IS : 5791-1977.

5. Marking — The rings which are to be fitted in a particular direction shall be marked with the word 'TOP' on the top sides of the rings. For other markings reference should be made to IS : 5791-1977.

5.1 *ISI Certification Marking* — Details available with the Indian Standards Institution.

EXPLANATORY NOTE

This standard is one of the series of Indian Standards on piston ring dimensions, tangential force, etc. IS : 5791-1977 is a necessary adjunct to this standard which gives details of materials, surface finish, gap types and sizes, surface coatings, manufacturing processes, etc.

In the preparation of this standard due consideration has been given to the prevalent sizes in the industry. It is recommended that for new designs, only the sizes given in this standard be used. The sizes given within parenthesis are non-preferred and should be avoided.

In the preparation of this standard assistance has been derived from DIN 70946 'Piston rings for automotive engineering, S-rings, slotted oil control rings from 50 up to 200 mm nominal diameter', issued by DIN Deutsches Institut für Normung.

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